

In the swamp to the north of the city, *Juncus stygius* L. was seen in a few places. It is a very slender rush, and rather rare, occurring sparingly on our northern borders and the neighboring parts of Canada.

A form of *Solidago humilis*, from 12-18 inches high, was collected in the sandy land near the mouth of Carp River. The floral portion of the stem is quite pubescent, and the part below slightly so, but the plant is smooth at the base. The leaves are sharply serrate, or somewhat toothed, approaching the variety *Gilmani*, but hardly marked enough to be separated from the type.

Among vascular cryptogams, or pteridophytes, one sees in plenty the five common species of club moss, and once in the wet sands north of Marquette the rarer *Lycopodium inundatum* was detected. It is also found in our own vicinity at Tolleston and Millers, growing in similar places, though I have not seen it elsewhere in collecting about the lakes, although it has a few other stations assigned it. East of Marquette on the ridges of the rocky wooded hills sloping toward the lake, grew in abundance *Equisetum scirpoides*, the smallest of the horsetails, and not very common, though it ranges throughout the region of the lakes. I have met with it but once before, at Northport, Grand Traverse Bay, where it sometimes took as a habitat stumps and logs on which sand had lodged. A noticeably small form of *Botrychium Virginicum*, from 7-9 inches high, was found beside Teal Lake, Negaunee, and in the Keweenaw Peninsula, like that described as *B. gracile* Pursh. Wherever seen the species seemed more slender than the common form farther south.

Englewood, Ill.

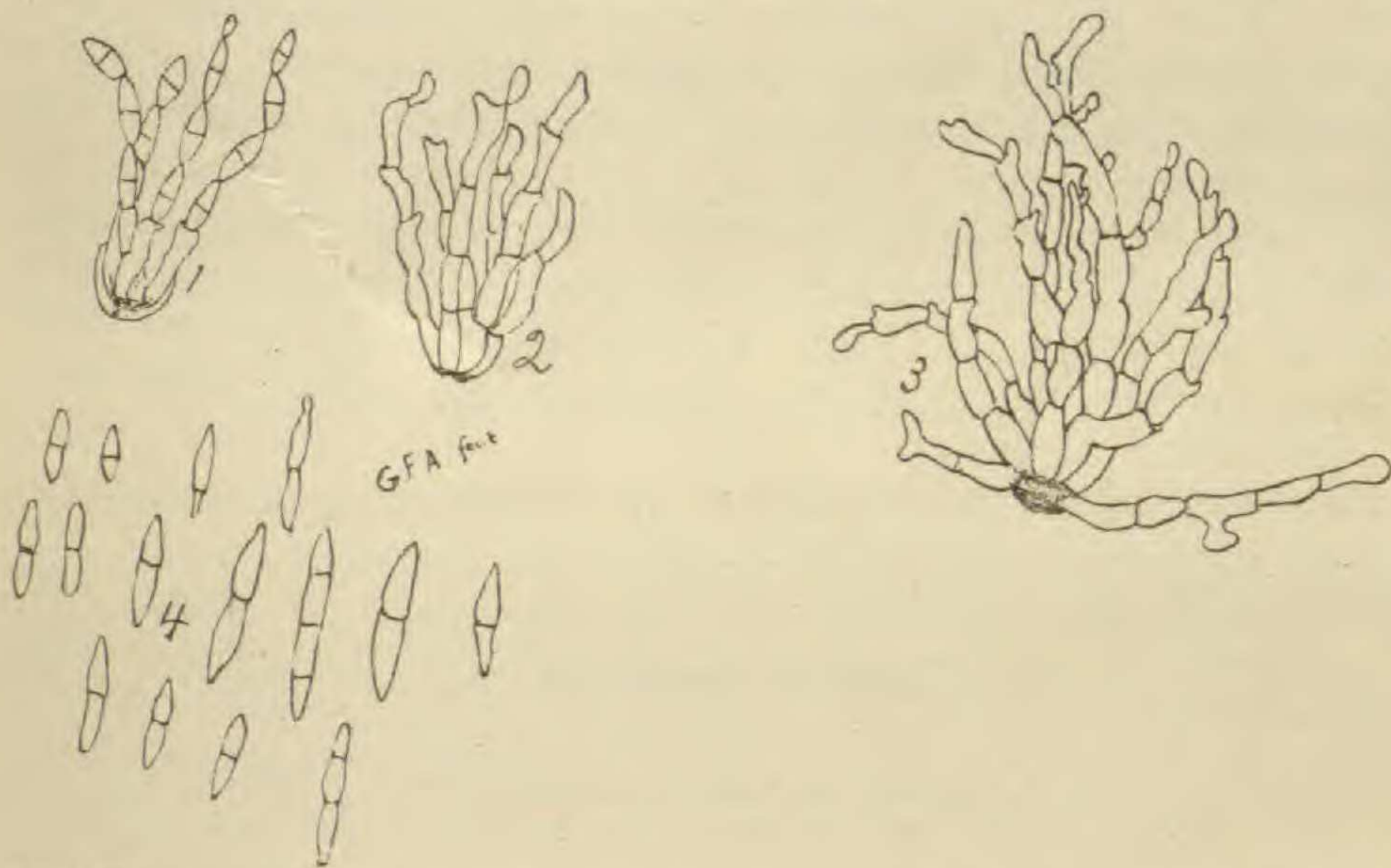
A new *Ramularia* on cotton.

GEO. F. ATKINSON.

During the autumn of 1889 I collected from several different plantations in the vicinity of Auburn, Alabama, leaves of cotton infested by a fungus which proves to be an undescribed species of *Ramularia*. In view of the importance of cotton culture and the fact that some species of *Ramularia* are known to be quite destructive to a few cultivated plants it may not be out of place to record the discovery and characterize the fungus.

Although the spots are not very distinct on the upper side of the leaf, except in cases where the hyphæ are epiphyllous, or the spots are quite old, the presence of the fungus is easily detected in passing along by the plants, for the leaf is quite translucent in the diseased places, so that the irregular angular areas present a very light yellowish green color in distinction from the darker green of the healthy portions of the leaf.

In this respect it reminds one of such species as *Ramularia serotina* E. & E. (N. A. F. 2463), and *R. virgaureæ* Thüm. (N. A. F. 2291), as well as one can judge from those in the dried state, though the spots on the cotton leaf are not so plainly visible above when the leaf is dry. The spots of *R. areola* are also larger and more definitely angular. The



conidia and hyphæ differ from those of *R. serotina* in being proportionately stouter; from *R. virgaureæ*, which, by the way, Ellis and Everhart say pertains to *Cercospora*,¹ also in being stouter and the conidia not so long as they sometimes are in that species.

The conidia are developed in great profusion and in an undisturbed condition give to the under side of the leaf, to the unaided eye, the appearance which certain species of the downy mildews give to their hosts, and before an examination with the lens I anticipated a *Peronospora*.

In the early development of the conidia the hyphæ are quite uniformly short and the conidia concatenate. As the

¹Journal of Mycology, Vol. V., no. 2, p. 69.

fungus ages the hyphæ are longer and fewer conidia remain in chains. When the conidia are not so profuse as to cover the surface of the spots, with the aid of a lens the hyphæ can be seen in definite clusters. As the hyphæ age it is not infrequent for the conidia to be unilateral when the hypha will be curved as some are represented in fig. 4.

The figures will be easily understood, the progress of development of the hyphæ being shown from figs. 1 to 3.

Ramularia areola n. sp. Spots hypophyllous, rarely amphigenous, pale at first, becoming darker, 1-10 mm. (mostly 3-4 mm.), angular, irregular in shape, limited by the veins of the leaf, conidia in profusion giving a frosted appearance to the spots. Hyphæ hypophyllous, rarely amphigenous, fasciculate, in small clusters distributed over the spots, subnodose, older ones frequently branched below, more rarely above where they are toothed, teeth frequently unilateral when the hyphæ are curved instead of zigzag, several times septate, stouter below, hyaline, $25-75\mu \times 4.5-7\mu$. Conidia oblong, usually abruptly pointed at the ends, sometimes rounded, 1 to 3-septate, concatenate in the early development of the hyphæ, hyaline, $14-30\mu \times 4-5\mu$.—On leaves of *Gossypium herbaceum*, Auburn, Alabama, Oct.—Nov. 1889. Geo. F. Atkinson.

Auburn, Ala.

Notes on technique. I.

JAMES ELLIS HUMPHREY.

Although the value and importance of good permanent mounts for the microscopic study of algæ and fungi is generally recognized, most of the methods by which they are prepared are tedious in detail or unsatisfactory in results, or both.

The balsam slide is to be regarded as the one embodying the desirable features of such a preparation; namely, transparency, simplicity in manipulation and indefinite preservation of the specimen in a solid medium which will neither run nor leak. Balsam, however, is unsuitable as a medium for most of the thallophytes, and we are compelled to seek a substitute which is less dense and which mixes readily with water. The best results have hitherto been obtained with the algæ by the use of solutions